



Ø BEAT

COLO. SPRINGS,
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MARCH 1983

Let's Take A Peek Into A Packet...

THE PACKET POCKET
JOHN VARGA, WA8ZIA
Packet Radio—Part Two

WHAT IS A PACKET? A packet is the basic message unit in packet radio. It ordinarily consists of a text message typed in by the operator, sandwiched between the header and tail information required by the protocol. In a typical QSO, a packet would be encoded and sent out by the TNC when the operator ends a line of typing by hitting the return or enter key. In any event, the length of a packet is limited, usually to 128 characters. This helps to prevent a single user from "hogging" the channel, as well as making sure that the sending and receiving TNC's don't get swamped with information.

A packet need not consist of ASCII or BAUDOT character strings, however. It could contain information in other coding systems, such as BCD or EBCDIC, or even binary data such as a compiled computer program. The TNC, which uses a "bit oriented protocol" based on a standard called High Level Data Link Control (HDLC), can encode any of these equally easily. An advantage to this choice of protocol is that the functions it requires are available on a single large-scale integration (LSI) chip, which simplifies the TNC hardware and software. A second advantage of HDLC protocol is that the beginning and end of the entire message are flagged, making the "start" and "stop" bits for each character unnecessary when the packet is transmitted in "synchronous" format.

The "frame" of an HDLC packet is represented below. Each field of the packet is encoded as a sequence of 1's and 0's (bits) to be transmitted as "mark" and "space" tones. With the exception of the data field, all these fields are generated by the TNC as it assembles the packet for transmission. The operator is concerned only with the contents of the data field.

The flag is a unique bit sequence which identifies the beginning of a packet to the HDLC controller. This pattern corresponds to no sequence which would be encountered in any of the other fields, except possibly in the transmission of binary data. Even in this case, there are provisions for distinguishing data from the flag sequence.

The address field contains routing information for the packet. This information may include the destination station, the originating station, and possibly the intermediate routing information if the packet will be relayed to the destination. The destination and originating station might be identified by a network address number or by amateur call sign, depending on the exact form of the protocol being used.

The control field describes the purpose of the packet to the network. It identifies packets within such functions as network check-in or check-out request, packet acknowledgements, or request for information from net control. It may also contain a sequence number for a multi-packet message which must be received in the correct order.

The data field contains the message being sent, which will ordinarily be the text typed in by the user, converted into an ASCII string. In the case of a packet identified in the control field as performing a control function, the data field may be absent.

The FCS allows the receiving station to verify that the packet has been received correctly. If the FCS calculated by the receiving TNC matches the FCS of the packet, an acknowledgement is sent; otherwise the packet is ignored.

WHAT IS A PACKET NETWORK?

A Local Area packet radio network (LAN) consists of a net control station and a number of individual operators. The net control station is sometimes referred to as the "station node" and the individual stations as "terminal nodes". The net may also contain a digital

Flag	Address	Control	Data	FCS	Flag
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The Pikes Peak Radio Amateur Association meets on the second Wednesday of every month at the First United Methodist Church, 420 N. Nevada, at 7:30 p.m. All amateurs and interested parties are invited to attend.

Editor: Don Lohse KBØKQ, 1410 E. LaSalle, Colorado Springs, CO 80907 635-7469

FEBRUARY MEETING MINUTES

The February 9th meeting of the Pikes Peak Radio Amateur Association was called to order at 7:40 p.m. at First Methodist Church, Platte and Boulder Streets. Charlie (KCØTI) opened the meeting as Dave (NØDV) had not arrived.

After introductions, Les, KCØNC, reported the treasury had \$2085.77 with \$162.78 in bills to be paid leaving a balance of \$1922.99. Greg, KAØFOZ, reported that volunteers are needed to help the RFI committee. Don, KBØKQ reported that no novice class will be held at present as no teacher is available. He asked for anyone willing to teach basic electronic theory to please step forward so classes may be held in the spring. Don also asked for Zero Beat articles. The articles do not need to be long.

Ken, WØTGL, spoke at length about the National Sports Festival. It seems there is a snafu with the commemorative station's location. Hopefully the station will not be scrubbed. Ken explained that he had written a letter to the festival people outlining the advantages and disadvantages of the proposed location of Pikes Peak and Cascade and the location at the Olympic Training Center.

As regards festival events, Ken noted that most are scheduled to be held at the Air Force Academy. Water sports are to be at Chatfield Reservoir near Denver. Communications are needed for all event as well as the torch lighting ceremony atop Pikes Peak on Memorial Day. Hams and non-hams are urged to plan now to help out the last week in June. Mark, KAØJXW, has begun distributing posters which will be updated as the event draws near.

Ken also suggested re-commissioning the engineering committee and forming a steering committee for coordination of the club's festival involvement. Both committees were formed forthwith. The Steering Committee includes: Ken Keyte, WØGTL as chairman; Dave Stivers, WBØSSG; Frank Freiler, WBØPAJ; Bob Poirier, KØDJ; Steve Sorton, NØST; and Mark Richardson, KAØJXW. Engineering Committee members are: Steve Sorton, NØST, chairman; Les Borst, KCØNC; Oak Stockton, KØROL; Al Bailey, ADØZ; Bill Allen, KFØW; and Mike Stansberry, KØTER.

Dave, NØDV, having arrived, continued the meeting with news on the Swapfest. The primary date will be April 24th and the location of the first choice is the Polka Club located behind the old El Paso Community College campus. This location provides much more space than was available in the past and has plenty of parking. Advertising space and ticket printing arrangements are nearly final.

Concern was expressed that many amateurs have received the impression that the PPRAA was sponsoring the "Swapfest" scheduled for Feb. 19th. However, no one expressed a need to take further action to correct the mistaken assumption.

Al, ADØZ, again reminded the group that club jackets and caps are still being made available for purchase. Caps are \$3.75 with the club logo and \$5.00 with the logo and personal call. Jackets also have the club logo and are \$12.50 unlined, \$18.75 lined. Al remarked these would be good visibility items for our work during the Sports Festival.

After the break, Chuck Hill presented a program on receivers. He indicated that a lot of QRM that is heard may not be on the band but instead may be in the

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FEBRUARY BOARD MINUTES

The February 14 meeting of the board of the Pike's Peak Radio Amateur Association was called to order at 7:30 p.m. in Jake's, NØCYR home. Present were Dave NØDV, Charlie KCØTI, Les KCØNC, Mark KAØJXW, Jake NØCYR, and Bud NØDDF.

The possibility of purchasing liability insurance for the club was the first discussion item. It was felt, with the upcoming events this year, that insurance may be a definite need. Prices are reasonable for a few days and differ only slightly for a year. Consensus was to explore purchase of a years worth.

Jake moved to approve expenditure of five to ten dollars for Don KBØKQ to spend on the purchase of a stapler. Mark seconded the motion and it passed unanimously.

Upcoming programs are scheduled as: March — Tom ADØO, computer applications; April — film and Swapfest; May and June — Sports Festival.

Articles for Zero Beat are still needed. They need not be long. Fiction is accepted, also.

Swapfest tickets are soon to be printed. Distribution will begin as soon as possible. Mark will send a blurb to QST and other magazines advertising Swapfest. The date is April 24th from 9 a.m. to 3 p.m. at the Polka Club, 2422 Busch Ave. in Colorado Springs. Flyers for the area will be ready by February 28th. Table prices were set at eight and ten dollars for an eight or ten foot table. Table sales will begin at 8:00 a.m. All others will be admitted at 9:00 a.m.

There will be no admission charge, however, donations will be accepted. There will be a bake sale, therefore, all chefs will have the opportunity to submit their wares. Other refreshments will also be available.

The new corporate report will be filled out by Mark and submitted to the state authorities with the proper fees.

At this point, it was felt more information is needed from the Sports Festival people before much more progress can be made. It was agreed the steering committee should keep a close watch on upcoming proceedings. A mass mailing to area hams to get the word out is desirable as soon as more is known.

There being no further business before the board, the meeting was adjourned at 9:50 p.m. The next meeting will be March 14th, 7:30 p.m. at the home of Les Borst.

Respectfully submitted,
Mark KAØJXW

SPECIAL NOTE

The FCC has just issued a Notice of Proposed Rulemaking that would create a codeless license that would grant full privileges above 50 MHz. No privileges on HF would be granted without passing a CW test. Comments (I'll bet there ought to be a few) should be sent to the FCC before April 29. If we don't get on our feet right now, the FCC is going to push this through, and the amateur radio service will never be the same again. Write your Congressman, Senator, the FCC, everybody! Express your opinion!!

Meeting Minutes (cont.)

receiver. He tested various receivers for sensitivity, blocking, dynamic range, and selectivity. Results showed much difference between various name brands.

The test setup involved two signal generators fed into a power combiner, then into a variable attenuator and into the receivers; from there, the signal was fed into an audio spectrum analyzer.

In addition to the above tests, a check of the S-meters was done and revealed a range of sensitivity from 6 uV, to 637 uV.

Following discussion, a demonstration on two receivers was performed. The meeting then adjourned at 10:00 p.m. The next meeting will be held March 9th at 7:30 p.m. in the First Methodist Church.

Respectfully submitted,
Mark KAØJXW

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Dick Kohlhaas, W5UDM

Packets (cont.)

repeater or "digipeater", which may be the net control station or a separate repeater station. The repeater station may be a single-frequency simplex repeater which retransmits any correctly received packets, or it can be a "normal" split frequency repeater.

As operators sign on to the net, they are recognized by the net control and given net address codes. An operator desiring to start a QSO with another net station will subsequently have his transmissions addressed to that station. Any operator may choose to have his TNC receive all transmissions, rather than just those addressed to his station. Of course, the TNC will only acknowledge those transmissions intended for that station. The operator whose station is functioning as net control participates in exactly the same way as other operators. The net control functions are taken care of automatically by his TNC.

As more packet radio LAN's become active, there will be the possibility of link stations with access to two distinct LAN's. These stations can be members of both nets and serve as communications links through which packets originating in one net can be funnelled to an addressee in the other net.

A more sophisticated possibility is that of a "gateway" station, which will be a specialized station having access to some long-distance mode of communications, the gateway station will reformat packets with another layer of protocol containing inter-network linking information and transmit it to another gateway station in a distant LAN. Three possibilities are being explored for long-distance links.

Terracon will be a high-speed ground-based linking system utilizing UHF and/or microwave relays. It could potentially handle most long-distance packet radio communications in the United States and Canada. It will

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probably be a few years before Terracon is implemented as a useful system, and somewhat longer before the continent is linked.

Amicon will be a satellite-based network utilizing one of the special services channels on the AMSAT Phase III-B satellite. Amicon will allow intercontinental linking land contact with isolated areas not accessible to Terracon. High data rate experiments are being planned for the 23 cm uplink/70 cm downlink (Mode L) translator. There are also plans for a packet radio digital repeater aboard the AMSAT Phase III-C satellite.

Skipcon is AMRAD's projected HF network of LAN gateway stations. The nature of HF propagation will require slower data rates (75 to 600 baud) and error correction as well as error detection protocol. Skipcon experiments have been conducted since the end of 1981.

From Bob German's HAM RADIO PORTAL and QSP

MEETING NOTICE

The March meeting of the Pikes Peak Radio Amateur Association will be held on March 9 at 7:30 p.m. at the First United Methodist Church located at the corner of Nevada and Boulder streets. The program will be given by Tom Weatherly and Andy Freeborn, and will cover the computer and its relation to packet radio, one of the newest modes of amateur radio transmission. All members and other interested persons are encouraged to attend.

UPCOMING SWAPFESTS

PPRAA Swapfest — April 24

Grand Prize

VIC 20 computer, cassette drive, \$150 worth of software

Aurora Repeater Association Swapfest — March 27

Grand Prize

Kenwood R600 General Coverage Receiver

Rocky Mountain VHF Society Swapfest — May 22

Grand Prize

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